

Contaminants Breakout

October 6th, 2004
SOLEC 2004

Discussion Worksheet Questions and Answers

Number of Worksheets Submitted: 18

Focus Question 1: What are these indicators telling us? Are the individual indicators and overall assessments correct and useful? Are they telling us things that can lead to better restoration and protection of the Great Lakes basin ecosystem?

Long term trends

- PPCP - USGS has manuscripts defining PPCP in water
- PPCP – Pharmaceutical Personal Care Products
- Also, several manuscripts related to Endocrine Disrupting Chemicals in biota in Great Lakes

Necessary for managers

- Contaminants in whole fish – need to describe why and which contaminants cause which disorders in fish/in piscivorous animals/in humans too. Combine sport fish with whole fish with regards to edibility
- A mixed status is not useful or interpretable by managers. The bundling approach results in vague designations.

No data is provided on mercury trends although there is ample data i.e. Battle's deposition trends on GLNPO website, net evasion from Lake Michigan study. Conclusions that "metals may not decrease" because metals continue to be emitted and regulation of coal fired power plants will help to decrease loadings are unsupported and in conflict with EPA position.

Indicators are telling us that, assuming that inputs remain the same, that there is generally improvement in the basin. This isn't an accurate assumption but, the indicators are not meant to be forecasts so, it is generally a snap shot. Phosphorus indicator doesn't show a trend so it is impossible to figure what it tells us. Emerging Chemicals of Concern are not assessed and a growing concern.

- Most indicators deal with legacy contaminants that have already been regulated – need to look at emerging chemicals e.g. PPDE's, pharmaceuticals.
- Consider an estimate of total toxic body burden to chemicals in humans and biota in ecosystem (synergistic approach)

An eclectic mix of topics selected. Is it a case of selecting the best thing to measure or a case of utilizing what is already measured (so as not to start new programs)?

A majority suggest the trends are mixed and improving or unchanged but the assessment is based on the evaluation of “old” contaminants which have been regulated for >25 years. Hence the indicator assessment (mixed/improving/unchanged) sanitizes conditions since no assessment of emerging chemicals is made.

4175 Drinking Water Quality - alone gives no indication of microbial contaminants in ambient waters. These contaminants (levels/concentrations) impact costs for drinking water. Also, current drinking water treatment approaches do not address majority of human pathogens. With declining water levels, important microbial contaminants in water become increasingly important. Absence of spatial /temporal qualifiers limits the use and reliability of such indicators.

111 – How are these conclusions drawn when basic loading information is generally not collected? One would believe these indicators and conclusions still are drawn based on “expert” opinion rather than comprehensive data.

Indicator #117 figure 5: this figure shows net loss of PCB from Lake Michigan that is rather consistent 1992, 93, 94. However, starting in 1995 there is a drastic reduction in this net loss! Can this be explained? Suggest comparing Blanchard estimates to Lake Michigan: Mass Balance Study Modelling estimates.

These are a step in the right direction. They can lead to restoration, however, not necessarily protection. Protection requires quick identification of contaminants and their potential impact on the ecosystem.

“Mixed” not clear in its meaning.

The indicator reports don’t seem to contain what the participants in the breakout groups want. SOLEC organizers should more carefully consider what they want from authors. Also, some figures have been reduced too much and are unreadable.

Phosphorus loads not linked/assesses in relationship to agricultural practices in vicinity of measurements.

The indicators are “patchy” i.e. there is little integration among the indicators. What should be done is following a series of contaminants in different media e.g. from

sediments, water and biota at different trophic levels. This kind of data set will be conducive to modeling, which is a great tool to use to predict future trends in contaminants in the ecosystem.

Indicators are telling us - concentration of contaminants getting better or worse.

- Need to determine effects of contamination on ecosystem, many are not bioavailable
- Phosphorus ban led to industry manufacturing nonylphenols and ethoxylates to replace phosphorus – NP's and NPE's may be worse than phosphorus.

Focus Question 2: What refinements, simplifications, or enhancements would you propose: To the assessment process? To the bundling of indicators?

A few indicators should be considered in other bundles or add a cross reference to a different bundle.

124 – Move to Nearshore Aquatic (or both contaminants and nearshore)

4175 – Human health

4204 – Human health

There is no simple solution to assessment. In Ontario we have routine MOE sport fish sampling and are struggling with commercial fish sampling. Inter-jurisdictional guidelines need to be highlighted. Don't bundle indicators based on contaminants but maybe focus on habitat or simply aquatic – in water aquatic benthic, terrestrial - -bitic, aquatic biotic terrestrial physical, aerial. Get Lake Ontario mercury levels for walleye into your whole fish and sport fish indicators.

Add PPCP's – Pharmaceutical and Personal Care Products, including an increasingly important but undervalued wide variety of contaminants.

Big overlap in "Toxics in Media" and "Sources and Loadings" sub-bundles. Maybe eliminate the "sources" sub-bundle as all of its indicators are covered in the "toxics in Media" section. Or make a better distinction between sub-bundles.

- Look at basket of chemicals that can be monitored regardless of media i.e. pick best/easiest media for monitoring
- Make decision as to toxicity for biota/humans
- Assign TEQ for chemical and establish body burden

- When possible try to include both Canadian and US side for each indicator (e.g. #4201 is almost exclusively US based including authors and sources; #114)
- Front page of contamination bundle package – would be useful to show assessment right within the indicator's title (saw many people writhing them in for themselves)
- Page numbers for reports helps discussion
- Information presented in “Indicators 101” not clear in reports e.g. measurement (observed state) – clear; reference value (desired state) – not clear.
- Liked seeing breakdown of info available by lake within indicator report e.g. 114.

Call the bundle “pollutants” to include nutrients, PTS, pharmaceuticals. To most contaminants are only PTS. Separate out data on presence and trends of pollutants. A separate category could be “effects”. Perhaps in an Ecosystem Health bundle which would also include ecological community health.

Both temporal and spatial factors are important to the long term data sets, trend analysis. Spatially confined/defined analyses are more relevant/useful to decision makers e.g. indicators across a lake basin say little about trends in specific localities. Little is shared about the amount of information or data used to construct an indicator, many times there is little data to back indicators and therefore extrapolations are made which defy sound statistical practices.

I don't see any way to incorporate newly identified contaminants into the indicators. New contaminants like fire retardants and pharmaceuticals into the indicators and to make certain that these are in fact monitored.

Enhancement – expand beyond historical contaminants

Maybe group the indicators by longevity of their database (0-5 years, 5-10, 10-15 etc.) and/or by how many lakes or sites are included. There seems to be discontent among breakout participants on presence or absence of trends – US – one shot sampling. They could also be organized by whether they contain legacy or new compounds.

Need to add indicators for personal care products and pharmaceuticals and other emerging problems such as fire retardants and surfactants. Need to also clarify what pharmaceuticals are being measured e.g. discharge of original product from manufacturing, or residuals in sewage.

Currently there are 4 fish indicators. To make indicators more manageable, we need to reduce the number of indicators and focus on integration of these indicators as outlined in question 1 above.

(* commented on patchiness among the indicators in question one and suggested reporting by media and trophic levels*)

Should #4175 be in human health suite rather than contaminants? Or only in human health suite?

Should #4201 be only in human health suite?

Reference under 4204 and 9000

IJC, Canada-U.S. Air Quality Agreement 2002 Program Report

I believe that this should be U.S. and Canadian governments, Air Quality Committee...2002 Program Report

The progress reports are governments – not IJC

For mixed indicators – have a one sentence reasn.

Focus Question 3: What are the key management implications that emerge from evaluating the indicators in this category?

Contaminant concentration/need new PPCP

Must have long term trends of contaminants in the various media.

Monitoring for basin wide information is needed for many contaminants and many other indicators.

Fish only

- Regulation of commercial harvest and/or scale
- Consumption guidelines
- We need to know how the contaminants found in fish effect their life history and the condition/quality of fish food so that we can understand their role in restoration effort, fish reproduction, food web structure, etc.

Further control of U.S. mercury emissions is unlikely to measurably change methylmercury levels in Great Lakes fish as evidenced by any significant decline in fish tissue in Lake Erie from 1979-2003 in spite of a 50% decline in U.S. emissions. Need to define natural levels of mercury in fish.

Future stressors/unaccounted for stressors will need to be considered on order to have a clearer picture of the state of the lakes (i.e. climate change, population growth, emerging

chemicals of concern, urban sprawl etc.). Indicators and bundles don't line up properly. Are we forcing ourselves to use what we have available to make assessments? Or are there indicators missing that should be developed in order to answer what we would like to know? Assessments and trends are misleading and don't give a good breakdown of problem spots.

- Since focusing on legacy chemicals we are evaluating the effectiveness of decisions that were made 20 years ago.
 - AOC's are well characterized need to implement RAP's
 - Need to make decisions on "new" chemicals given what we know have been problems with related chemicals e.g. PCB's, PBDE's and step up monitoring of the new chemicals.
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- Are the resource pressures/shortfalls that are causing monitoring programs to be cutback or cancelled part of the "management implications" section? i.e. Are you basing your indicator suite on something that may not be monitored in the future?
 - Should a stronger tie start to be made to RAP and LaMP programs? But on the flip side are some monitoring programs used too biased on samples at AOC's which might skew the "lake wide" trend?

Based on a limited number of indicator chemicals (PCB/DDT/Hg) the assessments provide a "sanitized" view of chemical/pollutant conditions in the Great Lakes Basin. This may be a false conclusion if trends in emerging chemicals are included. This would lead to a lack of management response.

Do we get the whole story in a way so that management implications are apparent? These should be identified in the document for each indicator. Not consistently done. For "mixed": what has improved, stayed the same, or gotten worse?

Need for development of metadatabases so that spatial and temporal analysis and developing of story of how contaminants are distributed in different media, over time and space. This would lead to a more useful, targeted story to assess how well current programs are working and what improvements are needed.

As management tools alone – not helpful. Requires a tremendous explanation/discussion to explain and understand their meaning, limits, or usefulness. While site specific chemical emissions/loadings across the basin(s) may have been reduced, the total loadings of chemicals are far greater than is being revealed. Decision makers are not given an analysis that reflects the complexity of the systems. Loadings are less, but not without impact to human and ecosystem health. Humans want "a number", "an answer",

as sensitivity analyses have not been conducted, err on the side of caution in relaying this information, rather conclusions. These indicators paint a far rosier picture than maybe supported by underlying data or analyses. Uncertainties are huge, more data are needed, greater monitoring required, both more frequent and more extensive, but also on new emerging chemicals and their effects. SOLEC establishes a “shell” process; the greater whole needs to be fortified before these conclusions can be demonstrated reliable. Additionally, the lack of an integrated approach across the various media gives a “stove pipe” perspective of the ecosystem’s condition. Also, declining chemical loadings may also be related to loss of industries (steel, coal mining, and metal processing) both offshore and defunct. The contributions of other socio-economic factors are not addressed, nor can they adequately be done with available data. EPA/EC regulations alone are not drivers. Indicators point up, down, and sideways, they simply give an “indications” not a statement of condition in dynamic systems. Far too many “mixed, improving” to be believable...really.

Modeling of integrated data is a powerful management tool. We can predict trends and therefore try to manage problems at a relatively early stage before they become very serious.

Sources of contaminants:

- Wastewater treatment
- Combined sewer overflow management
- Sewer use source control
- Industrial, commercial, institutional best management practices
- Monitoring point and non-point sources

Few real management implications because of focus on limited set of PBT dirty dozen.

General

Suggestion (Bruce Morrison): For peer review issue: have LaMP Working Group reviews basin wide indicators as well as Lake specific sections as LaMP working groups represent a wide variety of science backgrounds and managers. You then need an editorial team from subset LaMP management boards representing all Lakes and St Lawrence River.

Hearing somewhat ominous comments from indicator developers in the room that they don’t get feedback, but are given instructions by SOLEC managers, they don’t get these sheets. Therefore what is really the value of this approach if this is a general condition of the feedback process?